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**The Growing Block Theory and
the Epistemic Objection**

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ABSTRACT

As a main challenge to the *growing block theory (GBT)*, the *epistemic objection* is intended to show that GBT is untenable because it leads to the ignorance of the objective present. What is worse, extant solutions to this objection, the dead past view (DPV) and strong tense views (STV), are unsatisfactory on the ground that their semantic explanations of tensed statements undermine the purported semantic unity of GBT and thus make GBT collapse into a version of presentism. In contrast to extant solutions, I recommend growing blockists to adopt a new “biting the bullet” solution: They should accept the ignorance of the absolute present for the dual purpose of retaining GBT’s semantic unity and theoretical independence. Moreover, I argue that ignorance is not a big loss for growing blockists: Although they lose the so-called “Moorean common advantage” over B-theorists and include some “deeply mysterious” and epistemically inaccessible fundamental posit in their ontology, growing blockists thereby protect the semantic unity of their theory and most of ordinary knowledge about B-relations between moments of time and their temporal locations. Theory choice, in essence, is a matter of balancing benefits and costs. I believe that versions of GBT which accept the ignorance of the objective present are indeed tenable intermediate positions in the philosophical debate about the nature of time, and they deserve serious considerations of B-theorists.

Key Words: growing block theory (GBT); epistemic objection; principle of relevance; semantic unity; objective presentness

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1 Introduction

This paper is about the nature of time. Is there an ontologically privileged moment of time? If there is, do we have knowledge of that moment? The epistemic objection says, even if there is such a moment in the growing block, we have no knowledge of it. The thesis of the paper is to argue that growing blockists can bite the bullet by paying a minimal price.

1.1 The Big Picture

To begin with, I shall outline the big picture of metaphysics of time, and then turn to the *growing block theory (GBT)*. As for the metaphysical status of time, the first question naturally comes to our mind: *Is time real?* A *realist regarding time* will answer, “Yes”. In her view, time is an indispensable part of the reality. By contrast, an *anti-realist* will give a negative answer: Either time does not exist, or its existence depends on our minds in some way. In brief, the reality does not involve time in it.

A realist regarding time is either an *A-theorist* or a *B-theorist*. The crucial disagreement between A-theorists and B-theorists focuses on the following two questions:

Q1. Is the reality fundamentally dynamic? Or, is there an objective flow of time?

Q2. Is there an ontological difference between the past, the present and the future?

“Yes” is what an A-theorist would say, in answering to both questions. A metaphysical theory of time is an *A-theory* if and only if it asserts that (1) there is an objective flow of time, and (2) the objective present has ontologically privileged status which both the objective past and the objective future lack. The most classic A-theory is *presentism*. In the presentist view, the world is fundamentally dynamic in the sense that there is objective presentness, and different moments of time instantiate objective presentness sequentially; and the objective present moment is ontologically privileged because it is the only real moment in the world.

On the contrary, B-theorists' answer to the above two questions is, "No." *Eternalism* is the most standard B-theory. An eternalist world is a fundamentally static block in which all moments exist equally. Such a static world, eternalists believe, can be wholly captured by a single complete tenseless description.

1.2 What is a Growing Block?

So much for the big picture. Let us turn to GBT. Roughly speaking, GBT is the combination of the following three views:

- (i) The objective past and the objective present are real but the objective future is not.
- (ii) The objective present is the only ontologically privileged moment of time: it is a movable dividing line between being and non-being.
- (iii) The world is a growing block in the sense that it includes more and more real time-slices as the objective present moves.

GBT is obviously a version of A-theories. However, there is a sense in which it is more like eternalism rather than presentism. That is to say, GBT denies the presentist claim that only the objective present is real among all moments, and agrees with eternalism that the world at each moment is a fixed four-dimensional block.

1.3 A Technical Representation: Double Time

To elucidate the place of GBT in the big picture better, a useful theoretical construction, *double time*, is introduced here. For B-theorists, each moment of time exists merely as a *B-time* without any ontological privilege. A *B-time* is a fixed time-slice in the world as a four-dimensional block, which is *B-related to* (earlier than, later than, or simultaneous with) other time-slices.

Nevertheless, A-theorists are willing to accept the *dual existence* of time. A moment of time can exist not only as a B-time but also as an *A-time*. An *A-time* is a moment which instantiates objective presentness. Each moment can be an A-time. But if a moment happens to be an A-time, then all other moments are not, although each of

them will be, or was, an A-time.

With the theoretical construction of double time, GBT, presentism and eternalism can be represented in a more technical way, as the Figure 1 shows.

Generally speaking, A-theorists believe that the world *at different A-times* has different **total states** due to its dynamical nature. For example, when t_1 is the A-time (viz. the objective present), the world has a total state, W_1 ; when t_2 , the next moment later than t_1 , becomes the A-time, the world has a different total state, W_2 ; ...; when t_n becomes the A-time, the world has the total state, W_n . The dynamical nature of an A-theoretic world can be thereby represented by *changes in its total states*.

More specifically, for any target A-theoretic world, there must be a real moment of time which currently instantiates the property of objective presentness. We use t_k ($k > 0$) to refer to that moment, and thus represent the world as W_k whose A-time is exactly t_k . Now the dynamical aspect of the world can be represented by the tensed fact that it is currently W_k , but it was once W_m where t_m is the A-time ($m < k$) and will be W_n where t_n is the A-time ($k < n$).

In the same way, the growing-blockist world is represented as its current total state, and its A-theoretic change is represented by tensed facts about its earlier or later total states. For any total state of the growing-blockist world, W_n , W_n consists of (i) the fact that t_n is its A-time, (ii) all B-times until t_n (as a B-time), and (iii) all real entities located at those moments, including B-relations among moments. What is more, the growth of such a world lies in the fact that each of its total state later than W_n always includes more B-times than W_n (see Figure (1a)).

Compared with the growing-blockist world, the presentist world is a bit different. Figure (1b) tells us, in the presentist world, any total world state, W_n , only consists of (i) the fact that t_n is its A-time, (ii) t_n (as a B-time), and (iii) all real entities located at t_n . More importantly, the presentist world is not growing in the GBT's sense. After all, all total states of the presentist world include only a B-time, respectively.

Unlike any A-theoretic world, a static eternalist world is directly represented by its single total state, W , in Figure (1c). W consists of all moments of time (as B-times) as well as real *entities* (objects, properties, and relations) located at those moments.

Before I finish this subsection, there are two points which I want to make:

Firstly, when I claim that the moment t has dual existence, what I mean is not that there are two distinct moments. Rather, we only count the same moment twice. This **double-counting** of time can help us talk about the objective flow of time and A-

theoretic changes without introducing an extra dimension of reality like *supertime* (Cameron 2018: p. 91).

Secondly, although we say that the dynamic aspect of an A-theoretic world can be represented by tensed facts about its earlier or later total states, this does not mean that those earlier or later total world states (e.g. W_m and W_n) are as real as the current total world state, say, W_k . Among all total states of an A-theoretic world, only its current total state is real, otherwise the A-theoretic world has many distinct real total states and thus includes many different real A-times in it, leading to a McTaggartian paradoxical result that a moment of time is both past/future and present. This point is appropriately expressed by R. P. Cameron as the slogan “the only correct perspective on reality is the present one” (Cameron 2018: p. 104).

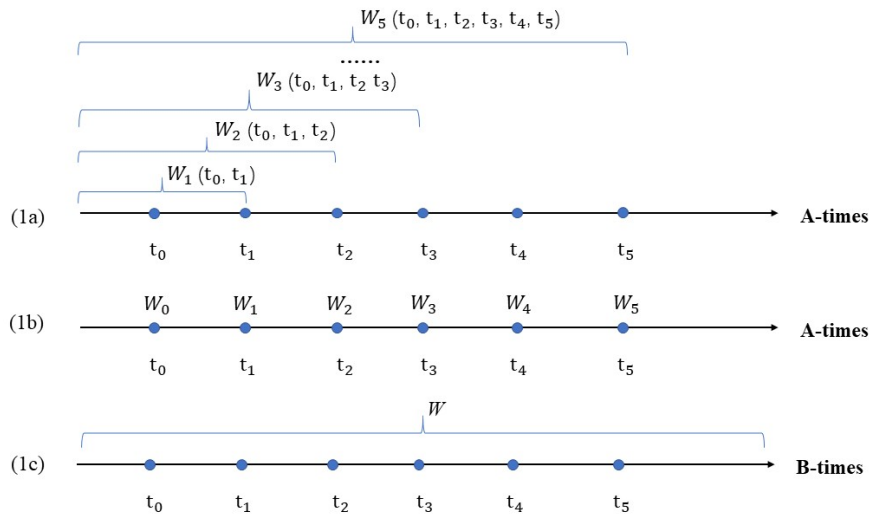


Figure 1. GBT, Presentism, Eternalism

2 The Epistemic Objection

2.1 Presentation of the Objection

The purpose in this section is to pose the epistemic objection. Here I first introduce a semantic division of usages of the terms “*present*” and “*now*”. As C. Bourne (2002) has shown, the terms “present” and “now” can have two different uses: the *indexical use*, and the *referential use*. Both B-theorists and A-theorists agree that “present” and “now” can be used as indexicals: they merely pick out the time-slice in which speakers or thinkers are located. But unlike B-theorists, A-theorists also support the referential use of “present” and “now”: when used *referentially*, they directly refer to the objective present with ontologically privileged status.^{①②}

D. Braddon-Mitchell (2004) formulates the epistemic objection as a somewhat tricky question: “*How do we know it is now now?*” With the above division, we can further clarify this question: How do we know that *our present*, viz. our temporal location in the current world, is the *objective present*?

At first sight, this question is interesting because two uses of “now” or “present” do not always pick out the same moment in the growing block. For convenience, we use the proper name “@” to refer to the current world. Suppose our current temporal location, *t*, happens to be the objective present. This amounts to saying, two uses of

^① T. Merricks (2006) makes a division between *subjective present* and *objective present*, which is similar to Bourne’s. However, the term “subjective present” easily misleads readers that it refers to the speaker’s subjective experience of the present rather than her temporal location. Therefore, it is a better choice to adopt Bourne’s division.

^② Some astute readers wonder whether the referential use of “present” and “now” is related to David Kaplan’s *theory of demonstratives*. According to his theory, pure indexicals like “present” and “now” are direct referential terms, although context-sensitive (Kaplan 1989: p. 492). I am neutral on Kaplan’s theory, but it should be emphasized that his theory is only to characterize the indexical use of “present” and “now”. By contrast, Bourne’s term “referential use” should be understood as a special technical term, a proper name whose referent is exactly the objective present, the only ontologically privileged moment in the world.

“present” pick out the same moment in @. Also suppose that at t , Karl has the belief P that t is the objective present. Obviously, P is true at t in @. However, in other total world states involving t , t is not the objective present. Two uses of “present” have different referents there. Proponents of the epistemic objection claims, there is no salient epistemological difference between @ and those possible world states on the ground that Karl’s cognitive states at t always remain the same in @ and those world states. Thus, Karl’s belief that P is not justified in this case.

Next, I will utilize the *evidentialism* and *relevant alternatives theory* to improve the objection that Braddon-Mitchell gives. On the one hand, as a theory of epistemic justification, evidentialism says that S ’s belief that Q “is justified to the degree it fits S ’s evidence” (Steup, 2018). Consider that justification is a necessary condition of knowledge, we can reasonably claim that S knows that Q only if Q fits S ’s evidence to some degree. On the other hand, relevant alternatives theory is primarily a theory of knowledge: S ’s belief that Q is an instance of knowledge only if S precludes all relevant alternatives to the state of affairs in which Q is true. These two epistemological stances can be “combined” into the following principle:

Principle of Relevance. S knows that Q only if S ’s total evidence is sufficient to preclude all relevant alternatives to the state of affairs in which Q is true.

A few words about the notion of *relevant alternative*. Firstly, an alternative to the state of affairs K is any state of affairs incompatible with K (Steup, 2018). Secondly, although the notion of relevance is a bit unclear, its basic conception is that an alternative to K is relevant to K in the sense that it shares *similar basic features* with K , for example, similar external environment, underlying metaphysics, and cognitive abilities of agents involved (if there is). This conception is acceptable to both internalists and externalists.^③

Now we can formulate the epistemic objection as follows:

The Epistemic Argument against GBT:

- (1) Karl knows that P at t in @ only if his total evidence at t in @ is sufficient to preclude all relevant alternatives to the state of affairs of P ’s truth-at- t -in-@.

^③ In fact, my notion of relevance is a bit similar to J. S. Russell’s notion of *closeness*. His interpretation of closeness, see Russell (2017), p. 156.

- (2) If GBT is true, there are infinitely many possibilities where t is in the objective past and Karl, as a past person, falsely believes that P on the basis of his total evidence at t .
- (3) These possibilities are relevant alternatives to P 's truth-at- t -in- $@$.
- (4) However, Karl's evidence at t in $@$ is insufficient to preclude all of these relevant possibilities.

Therefore, if GBT is true, Karl does not know that P at t in $@$.

In fact, the conclusion is very general. In the growing-blockist world, there is nothing special about Karl, compared with other normal cognitive agents. Thus, the above conclusion can be generalized to any other *normal cognitive agent*, leading to the result that in any total world state, W_n , all normal cognitive agents do not know whether they are at the objective present. In the eyes of proponents of the epistemic objection, this is an unacceptable result, and hence we should not be growing blockists.

In what follows, I will make a preliminary analysis of premises in the above master argument against GBT, and elucidate three key points in evaluating this argument.

2.2 Preliminary Analysis

Let us examine premises of the epistemic argument one by one. The premise (1) is a direct consequence of the principle of relevance, which is relatively tenable. Furthermore, it is reasonable for growing blockists to assume that there are infinitely many possible world states later than $@$ which involves the moment t and the fixed state of affairs that Karl believed that P on the basis of his total evidence at t , although GBT itself does not entail this claim. So the premise (2) is a plausible premise, too.

By contrast, premises (3) and (4) are more problematic. Defenders of the epistemic objection might claim, the premise (3) is right because those possible world states later than $@$ do share similar basic features with Karl's actual situation. For example, those possibilities share the same underlying metaphysics namely the metaphysics of GBT with $@$; their external causal relations at t is also sufficiently similar to $@$; compared with Karl located at t in $@$, Karl located at t in those possible world states have also the same cognitive abilities. Thus, those possibilities where P is false at t are relevant

alternatives, just like the possibility of Karl's having a robotic left arm is a relevant alternative to the state of affairs of Karl's having a real left arm.

Among those possible world states, there are indeed some possibilities where Karl have even the same, or at least sufficiently similar, internal states. It is the sameness (or sufficient similarity) of Karl's internal states involved in @ and these relevant world states that constitutes a powerful reason for the premise (4). According to evidentialism, S's total evidence is just a certain internal state S has, whatever it is. Then, the sameness (or sufficient similarity) of Karl's internal states also shows the sameness (or sufficient similarity) of his total evidence. This is why Karl is unable to preclude these relevant alternatives only by his total evidence.

Before we turn to the diagnosis of the epistemic objection, I endorse the following three important claims:

(1) *The epistemic objection cannot be generalized to a challenge to all metaphysical theories about time.*

Not all metaphysical theories about time automatically lead to the ignorance of the objective present. Firstly, all B-theories are naturally immune from the epistemic objection simply because they do not posit the objective present in their ontology. For B-theorists, all moments exist merely as B-times equally. There is no ontologically privileged moment in the world, and thus it does not make sense to ask which of moments is the objective present with ontological privilege.

Secondly, not all A-theories are suspect of the objection, too. For example, presentists can reject the premise (3) directly. In their view, all possibilities where Karl had the false belief that *P* at *t* are irrelevant alternatives on the ground that they require a non-presentist metaphysical theory which posits real past entities.

Thus, the true targets of the epistemic objection are those A-theories admitting of the reality of past entities, e.g. GBT and the *moving spotlight theory (MST)*.^④

^④ As an A-theory, MST claims that the property of objective presentness, like a spotlight, moves and shines on different moments of time sequentially, and the special moment shone on by the spotlight is the objectively present; furthermore, the objectively past and the objectively future are as real as the objective present. In the past few years, two of the most prominent defenders of MST were R. P. Cameron (2015) and B. Skow (2015). For the sake of simplicity, I only consider GBT's solutions to the epistemic objection throughout my paper, although most of my comments also apply to MST.

(II) *The crux of the matter is the metaphysics of GBT rather than some particular epistemological principle associated with it.*

The principle of relevance is indeed controversial. Maybe some opponents try to reject the epistemic objection by denying this epistemological principle. Nevertheless, they miss the point. The real point is, in the growing-blockist world, the objective present is so *metaphysically similar* to the objective past that normal cognitive agents are unable to differentiate them. Given the metaphysics of GBT, the lack of ability to differentiate the objective present from the objective past can be represented by other epistemological principles except the principle of relevance. For example, J. S. Russell (2017) and K. Miller (2018) formulate the objection by appeal to the *principle of safety* and the *indifference principle*, respectively (Russell 2017: p. 157; Miller 2018: p. 6). In formulating the epistemic objection, Miller not only gives an *internalist*-friendly version, but also offers an *externalist*-friendly version (Miller 2018: p. 10-14). These facts are sufficient to show that rejecting some particular epistemological principle is not a satisfactory solution to the epistemic objection.

(III) *The epistemic objection is not a special case of global skepticism against ordinary knowledge.*

The epistemic objection is *structurally similar* to global skepticism to some degree: The former claims that Karl does not know about the objective present because he cannot discriminate between the objective present and the objective past; and the latter claims that Karl does not know that he has a left arm on the ground that he is unable to preclude the possibility of his being a *brain in a vat (BIV)*.

Nevertheless, we can find that there is still a *substantive difference* between them. Relevant alternatives theorists generally address global skepticism by rejecting the *epistemic closure*: The proposition that Karl has a left arm entails the proposition that Karl is not a BIV, but Karl can know that he has a left arm without knowing that he is not a BIV (Bradley, 2014; Steup, 2018; Luper, 2018). This is because, as relevant alternatives theorists claim, the possibility of BIV is not a relevant alternative to the state of affairs that Karl has a left arm. Nevertheless, relevant alternatives theorists cannot deal with the epistemic objection in the same way. Given our conception of relevance and the metaphysics of GBT, possibilities of Karl's being the objective past are indeed relevant alternatives to the state of affairs that Karl is in the objective present, compared with radical skeptical scenarios.

In the next section, I will diagnose the real difficulty that the epistemic objection brings to growing blockists, and explain why extant solutions to this objection are thus unsatisfactory.

3 Diagnosis: Two Objectives

Several solutions to the epistemic objection have been offered by philosophers such as P. Forrest (2004), T. Button (2006, 2007), F. Correia & S. Rosenkranz (2013), G. A. Forbes (2016), and Cameron (2015, 2017). But in my view, none of extant solutions is completely satisfactory. The reason why they are not satisfactory is that they try to achieve two objectives which are in tension with each other:

The First Objective: Make sure that normal cognitive agents in the world, whatever its A-time is, are in a position to know about the objective present.

The Second Objective: Retain GBT's core advantage over its main A-theorist rival, presentism, in explaining past-tensed statements.

Consider the *first objective*. If Karl does have knowledge about the objective present at t in @, then his total evidence at t is supposed to reject all possibilities of his being in the objective past. To do this, t 's being the objective present in @ is supposed to appear to Karl in a way significantly different from t 's being in the objective past in other total world states, for otherwise Karl is unable to discriminate between them. However, as we have seen in Section 2.2, whatever the A-time of the world is, Karl's cognitive abilities at t always remain the same (or sufficiently similar). In this case, "significant epistemological difference" actually requires the significant metaphysical difference between one's being at the objective present and its being in the objective past.

The *second objective* is to say that growing blockists should retain their purported *semantic unity*, as Miller (2018) points out (Miller 2018: p. 16). That is to mean, GBT should provide a *unified literal explanation* of both the *present tense* and the *past tense* by appeal to real entities in the world. For any total state of the world, W_n , any ordinary statement that Q made in W_n , whether it is past-tensed or present-tensed, is literally true in the sense that Q is *made true by* real entities in W_n of which Q is true. By contrast, the semantics of presentism is *disunified*: Presentists deny the reality of all past entities, and are thereby unable to explain truth of ordinary past-tensed statements literally.

It should be pointed out that the semantic unity of GBT is both *incomplete* and *limited*, as some astute readers may notice. On the one hand, GBT's semantic unity is

incomplete in the sense that GBT does not include a literal explanation of the *future tense* in its ideology. This feature may be a defect of GBT, but it can be well suited to our temporal experience concerning the asymmetry between the past and the future, which prompts us to believe in the reality of past entities and deny real future entities.

On the other hand, GBT's semantic unity is *limited* because GBT's literal explanation of the past tense cannot apply to past-tensed statements about *objective presentness* or *total world states*. Return to Karl's case depicted in Section 2.1. Suppose that t' is an earlier moment than Karl's current temporal location, t . Whether t is the objective present or not, t' is undoubtedly in the objective past in the current world @. Although t' is not the objective present in @, however, Karl can reasonably claim at t that (C) t' was once the objective present. Similarly, Karl is also reasonable to say at t that (D) our world was once W' where t' is exactly the A-time. Growing blockists tend to think that both (C) and (D) are true, but they cannot give a literal explanation of their truth by appeal to real entities in @ simply because what instantiates objective presentness in @ is some other moment than t' . To make (C) and (D) true, growing blockists thereby need to show that there is an earlier total world state than @, and t' happens to be the A-time in that total world state. Obviously, the required total world state is exactly W' .

The reason why GBT's semantic unity is limited as above lies in the metaphysical difference between objective presentness and other perfectly natural properties. In the growing-blockist world, for any perfectly natural property, once it comes to be instantiated by some real object in a total world state, both it and the relation of instantiation between it and that object remain to exist as past entities in all later total world states. (It is in this sense that we say that the past is "fixed"!)

By contrast, objective presentness is not like that. Even if objective presentness is instantiated by some moment of time in a total world state, the relation of instantiation between it and that moment would not be retained in later total world states. Rather, objective presentness would be instantiated by different moments in later total world states. Therefore, growing blockists are better to limit their literal explanation of the past tense to ordinary past-tensed statements about perfectly natural entities.^⑤

^⑤ What calls for special attention is that this limit on GBT's semantic unity does not automatically ensure that all tensed statements about presentness are true. For example, at t in @, the content of Karl's belief that P is a *present-tensed* proposition about presentness. In order to judge its truth-value, we need to consider the current total world state @ to see which of its

Semantic unity, though incomplete and limited, is still a theoretical virtue, and growing blockists have to pay a price for retaining it. A unified semantic explanation of the past tense and the present tense requires that real entities except objective presentness in @ play a sufficiently similar role in truth-making with themselves in any total world state later than @. In other words, as objective presentness moves, real entities transform into real past entities from real present entities, but their objective features and thus their roles in truth-making do not change in a significant way.

Finally, we reach to the *crux* of the problem:

If growing blockists want to offer a satisfactory solution to the epistemic objection, they have to offer such a sort of conception of the world: *t's being in the objective past in a total world state is not only significantly different from, but also sufficiently similar to, t's being the objective present in another total world state.*

However, it is improbable that such a solution exists.⁶ Naïve versions of GBT insist that the objective past plays a sufficiently similar role in truth making as the objective present, but they fail to deal with the epistemic objection. On the contrary, extant solutions which I'll talk about in the next section, viz., the *dead past view (DPV)* and *strong tense views (STV)*, reject the epistemic objection, but fail because of their semantic costs.

moments instantiates presentness. If some other moment than *t* instantiates presentness in @, the proposition that *P* is false. The purpose of epistemic objection is just to show that the epistemic possibilities of *P*'s being false lead to Karl's ignorance about the objective present.

⁶ Miller (2018) gives a similar diagnosis (Miller 2018: p. 31-32), but I believe that my diagnosis is clearer here.

4 Two Extant Solutions

4.1 Dead Past View (DPV)

In this section, I will show why DPV and STV fail. Although there are other possible solutions to the epistemic objection, some of which are mentioned in Russell (2017), they can always be connected to these two solutions in such and such a way. The first solution I consider is the *Dead Past View* (DPV) offered by Forrest (2004) and Forbes (2016). According to DPV, the objective past is dead in the sense that there is no real past consciousness or life in any total world state, W_n . For example, in the current world @, Caesar and Socrates are real, but Caesar's consciousness and Socrates' life are not.⁷ Proponents of DPV claim, this is because one's consciousness or life is grounded by some "incomplete causal processes" which include causes but lack effects, and the latter only occurs at the objective present (Miller 2017b: p. 21). Therefore, one's consciousness or life, if real in @, must be real as present entities in @.

Proponents of DPV thereby reject the premise (4) of the epistemic objection. If DPV is true, Karl's awareness of his consciousness or life at t in @, as a part of his evidence, is sufficient to discriminate t 's being the objective present in @ from t 's being in the objective past in later total world states and thus to provide him with knowledge about the objective present in @.

Whether DPV's conception of causality is correct or not, the combination of GBT and DPV gets into trouble in explaining truth-values of the following past-tensed statements, as C. Heathwood (2005) pointed out (Heathwood 2005: p. 250):

- (CC) Caesar was conscious when he crossed the Rubicon.
- (SA) Socrates was alive when he was sentenced to death.
- (CW) Caesar was wet when he crossed the Rubicon.
- (SF) Socrates was fat when he was sentenced to death.

⁷ For simplicity, I presuppose the *trope theory* of properties when I talk of "Caesar's consciousness" and "Socrates' life." However, this presupposition is not indispensable for my criticism of DPV.

Intuitively, we tend to hold all these four statements as *literally true* in the current world @. Unfortunately, DPV violates this intuition because of denying the reality-in-@ of Caesar's consciousness and Socrates' life. If (CC) and (SA) are true, they can be only true in a non-literal sense.

The situation is worse if we introduce considerations of *essential properties*. The following theses of essentiality are intuitively reasonable:

- (a) *Phenomenal consciousness* (e.g. the feeling of pain) is essential for human persons.
- (b) The property of being a human person is essential for identity of objects like Caesar and Socrates.

Now defenders of DPV face a *dilemma*: (i) Either they reject at least one of the above two *essentiality theses*, (ii) or they choose to accept both of them.

On the one hand, if they go the first way, they are supposed to admit that either human persons can exist without phenomenal consciousness, or Caesar and Socrates can exist without being a human person. It is obviously absurd that Caesar and Socrates can exist without being a human person. But if human persons can exist without phenomenal consciousness, I cannot see what reasons proponents of DPV can give to deny that *Zombies*, creatures which are just like us but without phenomenal consciousness, are real human persons. This result is terrible for DPV, too.

On the other hand, if proponents of DPV go the second way, they are required to accept that Caesar and Socrates, as real past objects in @, cannot exist without past phenomenal consciousness. Thus, combined with the truth of (a) and (b), DPV has an anti-intuitive consequence that Caesar and Socrates do not exist in @. Under this situation, proper names like "Caesar" and "Socrates" are *empty names*, leading to the result that (CC), (SA), (CW), and (SF) are even literally meaningless in @. DPV has thereby a more serious *semantic burden* than Heathwood (2005) has pointed out.

It should be noted that one of Cameron (2015)'s solutions to the epistemic objection can be also seen as an extended version of DPV, though he is actually a moving spotlight theorist rather than a growing blockist. In Cameron's version of MST (named by Miller (2017a) as "*CMST*"), past and future objects are as real as present objects. This is like traditional versions of MST. In contrast to most of traditional moving spotlight theorists, however, Cameron claims, although past and future objects are real, past and future

properties and relations are unreal, let alone past consciousness and life. Thus, CMST is an extended version of DPV in the sense that any property or relation instantiated by an object, if real in @, must be real as present entities in @.

If CMST is right in claiming that there is no real past property or relation in the current world @, then (CC), (SA), (CW), and (SF) must be non-literally true if true. Moreover, CMST cannot be also immune from the above dilemma DPV faces, leading to the same result that these four statements are literally meaningless in @. Therefore, Cameron's solution to the epistemic objection is not more attractive than Forrest's.

Forbes (2016) believes that DPV's semantic burdens can be removed by a sophisticated account of the past tense. As Forbes said,

“The past tense doesn't merely restrict the scope of our quantifications to times earlier than the present, but also asks us to consider those times as if they were succeeded by nothing.” (Forbes 2016: p. 704)

Look at Figure (1a) again. Total states of the growing-blockist world at different A-times, t_0, t_1, t_2, \dots are W_0, W_1, W_2, \dots . Suppose that t_1 is the moment at which Socrates was sentenced to death, and t_2 is the moment at which Caesar crossed the Rubicon. Forbes requires us to evaluate truth-values of (SA) and (SF) in @ in terms of W_1 rather than @. Similarly, we are also required to judge truth-values of (CC) and (CW) in @ by appeal to W_2 rather than @. Under this situation, these four past-tensed statements are all literally true in @!

At first sight, Forbesian semantics can save DPV from semantic difficulties concerning the past tense. Nevertheless, Forbesian semantics is also unsatisfactory because of undermining GBT's core advantage over presentism. After all, if Forbes is right, truth-makers of past-tensed statements made in @ are not *real past entities in @* but *real present entities in other total world states like W_1 or W_2* . In other words, the *actual pastness* of entities does not play a substantive role in making past-tensed statements true. On the contrary, it is their *as-if presentness*, viz. their presentness in non-actual total world states that explains truth of those statements. This fact means that Forbesian semantics, in its essence, is friendlier to presentists. Thus, if GBT is combined with Forbesian semantics, it would lose its charm among A-theorists.

4.2 Strong Tense Views (STV)

Strictly speaking, there is no single theory actually called the “*strong tense view*”. This name given by me is intended to cover a cluster of theories including Button’s and Correia and Rosenkranz’s (Button, 2006, 2007; Correia & Rosenkranz, 2013). A proponent of STV takes tense seriously in a very strong sense. For example, like Button has done, proponents of STV can insist that the *real-as-of* relation is *asymmetric*: “[A]s of any moment x , only x and moments earlier than x are real” (Button 2007: p. 326). Or, she can follow Correia and Rosenkranz’s view and claim that when we think of any moment in the world *simpliciter*, we can only look back at that total world state where it is the objective present (Correia & Rosenkranz 2013: p. 4).

In brief, STV’s solution to the epistemic objection is to reject its premise (3). If Karl happens to be at the objective present, then at t (as his current temporal location), his belief that t is the objective present must be true. All states of affairs of Karl’s being in the objective past are irrelevant alternatives to P ’s truth-at- t -in-@ on the ground that they are all metaphysically impossible according to the metaphysics of STV, and our conception of relevance requires that a relevant alternative has to be metaphysically possible.

However, STV fails because of its semantic costs in explaining present-tensed statements about the objective present. In fact, STV’s semantic explanation is similar to Forbesian semantics to some degree:

For any total state of world W_n , and any moment t_i , any present-tensed statement that Q^* made at t_i in W_n , is *true-at- t_i -in- W_n* iff the total world state in which t_i is its A-time, W_i , is the way Q^* represents.

Given the above semantics, Karl does not make mistakes in claiming at t in @ that t is the objective present simply because t is exactly the objective present in the total world state where t is its A-time. More generally, all present-tensed statements about the objective present made at any moment of time cannot be false, but this result is obviously counterintuitive. Suppose that at a moment of time, say, t'' , in 400 B.C., Socrates had the belief P'' that t'' is the objective present. There is no doubt that there is an earlier total world state than @, say, W'' , in which t'' is its A-time and thus

makes Socrates' belief that P'' true (according to STV's semantics). As time passes, Socrates and the relation of his believing that P'' remain to exist as real past entities in the current total world state, @. Here our intuition is that P'' is currently false in @, though it was once true in W'' . In contrast to our intuition, however, STV claims that P'' cannot be false and is thus also true in @. What is worse, proponents of STV actually explain P'' 's truth by virtue of the *as-if presentness* of the moment t'' when they judge the truth-value of P'' by appeal to W'' rather than @, leading the result that their semantic explanation is friendlier to presentists. Therefore, like DPV, STV cannot retain the semantic unity of GBT, too.

5 My Solution: Biting the Bullet

Is there a way out for growing-blockists? My answer is positive. There is a *biting-the-bullet* strategy which is ignored by us too early. That is to accept the ignorance of the objective present. Some philosophers like Braddon-Mitchell regard this reply as absurd because it causes serious consequences to growing blockists. However, I will argue that growing blockists are able to pay for this reply in a reasonable way.

5.1 Some Methodological Considerations

Here some methodological considerations need to be introduced. How does a dilemma work? Generally speaking, a dilemma against the target theory, T , first presents two incompatible ways where T is developed. Then, it shows that T would have unacceptable losses no matter what way it goes. Thus, it concludes that T is untenable.

Accordingly, there are also three options for T -theorists to refute the dilemma:

The first option is to claim that two horns of the dilemma are not *exhaustive*. That is to mean, T -theorists can avoid the dilemma by going a third way.

The second option is to argue that the dilemma is exhaustive but not *genuine*. That is to mean, T -theorists can accept one of horns in the dilemma, but they need not pay real cost for it.

Maybe the dilemma is both exhaustive and genuine. Even so, it is still possible that one horn of the dilemma brings smaller losses to T -theorists than the other horn. Theory choice, in its essence, is a matter of weighing benefits and costs. Thus, the third option for T -theorists is to accept that horn with smaller costs in order to defend their theory.

As we have seen, growing blockists get stuck in a dilemma: The more successful they are to respond to the epistemic objection, then the more dissimilar the objective past is to the objective present, and the less hopeful they are to retain GBT's semantic unity. By contrast, the more successful they are to retain the semantic unity, then the more similar the objective past is to the objective present, and the less probable they

are to reject the objection.⁸ And I believe that *this dilemma is both exhaustive and genuine*. Thus, the only possible way out for growing blockists is to accept the horn with the least cost.

From my perspective, semantic unity is more important for GBT than knowledge about the objective present. For GBT, the only role of the posit of real past entities is to make ordinary past-tensed statements true. If semantic unity is not required, real past entities would be completely *redundant* in the ontology of GBT, and thus GBT would collapse into a version of presentism immediately. Therefore, proponents of GBT should accept the ignorance of the objective present for the *dual purpose* of refuting the dilemma and ensuring that GBT does not collapse to a version of presentism.

Next, I would reply to two direct objections to my proposal.

5.2 An Objection from Intuition

The first possible objection is, *knowledge about the objective present is a part of our ordinary knowledge*, and thus my proposal would turn GBT into an extremely counterintuitive view.

For me, this line of criticism is untenable. In our ordinary life, the most common use of “present” is its indexical use (see Section 2.1), and thus most of our ordinary beliefs involving “present” or “now” actually concern about speakers’ or thinkers’ temporal location rather than the objective present. If so, there is no reason to think that we have direct access to the objective present in our ordinary life.

My opponents may cite John Perry’s example to show that we do have some access to the objective present. In his example, a professor (call him John) plans to attend the department meeting held at noon. John correctly believes that the meeting starts at noon, but he still sits in his office at that time. Suddenly, he stands up and leaves his office. Considering that change in actions is caused by change in beliefs, the best way to explain John’s new action is to suppose that he begins to have a new belief expressed by the sentence, “the meeting starts *now*” (Perry 1979: p. 4).

What is the difference between these two beliefs? Some may suggest, the first belief is merely a belief about John’s temporal location while the second belief is a belief

⁸ Miller has similar remarks in her paper (2018), p. 31-32.

about the objective present. Truth of the second belief shows that John can have access to the objective present.

If this reading of Perry's example is correct (although it is actually not), the professor ought to be able to give a Moorean argument for the existence of the objective present. Following M. Sullivan (2012)'s four-premise recipe of a general Moorean argument, a possible Moorean argument can be stated as follows:

The Moorean Argument for the Existence of the Objective Present:

(M1) Entailment. At a certain moment in the noon, say, t_k , John has a highly plausible commonsense belief about meeting: (*E*) *The meeting starts now*.

Let G be the property of being the objective present, ϕ the proposition that the meeting starts, and ψ the proposition expressed by "the meeting starts *now*". The belief that *E* can be appropriately logically paraphrased as (*F*): $Gt_k \wedge \text{at } t_k, \phi$.

By conjunction elimination and existential generalization, the proposition that *F* entails the *existence of the objective present* (EOP): $\exists t(Gt)$.

(M2) No Competition: No other paraphrase of the commonsense belief that *E* is as appropriate as the proposition that *F*.

(M3) No Defeat: There are no philosophical principles that are as plausible as the belief that *E* but contradict (EOP).

(M4) Mooreanism: "If a philosophical principle is entailed by sentences expressing highly plausible beliefs, the principle is undefeated, and it is not threatened by competing explanations, then it is very likely true", or at least it is irrational to deny that principle "once the relevant entailments are pointed out" (Sullivan 2012: p. 154).

Therefore, (EOP) is very likely true, or at least it is irrational to deny (EOP).

The above argument is logically valid but defective. There is no doubt that growing blockists who accept the ignorance of the objective present agree with the above conclusion. However, they tend to reject (M2) on the ground that the proposition that *F* is an implausible paraphrase of John's commonsense belief. In other words, they agree with Perry (1979) that the term "now" occurring in the sentence, "the meeting starts *now*", is still used as an indexical. Kaplan (1989)'s view of "now" is similar to Perry's. As Kaplan emphasizes, the reason why the indexical "now" are especially important to John is that a specific moment is presented to him by a privileged way inaccessible to others, but this does not mean that "now" thereby presents a

metaphysically privileged moment (Kaplan 1989: p. 533-534). If Kaplan is right, what really explains the change in John's actions is not the ontological privileged status of the objective present, but the epistemically privileged way his temporal location is represented. Therefore, for growing blockists who accept the ignorance of the objective present, a more appropriate logical paraphrase of John's belief should be:

(F^*) at t_k (Believe (John, ψ) \wedge ϕ).

Obviously, F^* does not entail existence of the objective present.

So with all that said, we lack enough evidence to prove that we have access to the objective present in our ordinary life. Growing blockists who accept ignorance thereby take a stance closer to that of *Veridicalists* mentioned in Miller (2017b): Our temporal phenomenology has representational content, but that content is not *as of* the objective present. In this sense, our beliefs about the objective present are best to be regarded as pure metaphysical beliefs.

A final comment on the objection from intuition. Some of my opponents may worry that my reply to this objection would make GBT lose its Moorean commonsense advantage over B-theories, and thus GBT would cease to be an attractive option for A-theorists. Nevertheless, this worry misrepresents what I really mean. If my solution to the objection from intuition works, not only GBT but also other versions of A-theories would lose the so-called "Moorean advantage". In this regard, GBT is not worse than other A-theories, e.g. presentism and MST, even if it does not behave better than them.

Indeed, some may remain worried that B-theorists will gain the final victory in explaining the nature of time if all versions of A-theories lose their Moorean advantage. But this may be not true. For me, the fact that A-theories no longer have the intuitive priority to B-theories does not mean the complete failure of A-theories. After all, A-theories including GBT are still a class of coherent and reasonable metaphysical theories about the nature of time. Whether they fail eventually depends on a comprehensive evaluation of their philosophical benefits and costs, and this task is beyond the scope of my paper.

5.3 A Slope of Ignorance

Here is the second possible objection to my "bite-the-bullet" reply that I'm rejecting:

The Slope of Ignorance: If cognitive agents are ignorant of the objective present, they would be ignorant of their own *temporal locations* in a similar way. Thus, growing blockists who accept my proposal have a more serious epistemological burden.

Suppose that at t in @, Karl has a belief P^* expressed by the sentence, “ t is present.” If Karl’s belief that P^* is a *temporally self-locating belief*, it actually says that his temporal location in @ is exactly t . Here we should not confuse the belief that P^* with the belief that t is t . The belief that t is t is necessarily true in @, but Karl’s belief that P^* is not. It is perfectly possible that Karl’s temporal location in @ is some moment other than t but he still believes that P^* in @.

Russell (2017) thinks that we can establish a *new epistemic objection concerning temporally self-locating beliefs*, which is *structurally similar* to the (old) epistemic objection in Section 2.1.⁹ The new objection says, just like Karl has no knowledge about the objective present at t in @ because of his inability to preclude relevant possibilities of P ’s being false at t , he does not know about P^* ’s truth-at- t -in-@ on the ground that his total evidence is insufficient to preclude relevant possibilities of P^* ’s being false at t , too.

My reply to this new objection is straightforward: It does not work. Unlike purported knowledge about the objective present, *temporally self-locating knowledge* is indeed a part of our ordinary knowledge, and growing blockists who accept the ignorance of the objective present can still retain this sort of knowledge.

To see this, we should notice that Karl, as a normal cognitive agent, seldom makes a mistake on his temporally self-locating beliefs such as the belief that P^* . After all, Karl’s temporal location is a *difference-maker* to his behaviors and plans. Suppose that Karl plans to take a final exam on Thursday and go to the gym on Friday. If his current temporal location is Thursday, he does not go the gym, otherwise he will lose his final grades. Similarly, if his temporal location is Friday, he cannot really take an exam simply because there is no exam at that day. Due to the significant impact that Karl’s

⁹ This new objection is actually introduced by Russell (2017) to attack the combinatorial view of eternalism and *propositional temporalism* (Russell 2017: p. 164). However, if I am right, Russell should believe that the same objection can apply to GBT, too. Of course, it should be pointed out that my attitude to this new objection is very different from his.

temporal location has on his ordinary life, Karl in normal cases has sufficient evidence, for example, success or failure of his actions and even the reading of his electronic watch, to pick out his correct temporal location.

Indeed, there are possibilities that Karl is mistaken about the time. According to the principle of relevance, however, all of these possibilities can be divided into two classes:

(a) The first class of possibilities are relevant alternatives, but they can be easily precluded by Karl's total evidence.

For instance, maybe Karl's neighbor wants to tease him and thus offers false information. Or, it is possible that Karl's watch breaks down at this time. These possibilities are very probable in the ordinary life, and it is appropriate to take them as *relevant alternatives* to the state of affairs that the belief that P^* is true at t in @. However, Karl does not need to worry about them because his total evidence can easily preclude them in normal cases.

(b) The second class of possibilities are difficult to be precluded, but Karl can rationally neglect them because they are irrelevant alternatives.

In a possible case, for example, Karl is knocked out by a gangster at t , and then immediately locked in a small dark room isolated from the outside. Suppose Karl regains consciousness at some moment later than t . Karl is totally unclear about how much time has gone by, and he is also unable to acquire any external information. Under this situation, if Karl continues to believe that P^* , he would have a false belief of his temporal location.

Nevertheless, this possible case is an *irrelevant alternative*: Karl in this case has wholly different causal connections to the external environment, compared with normal cases. Thus, according to the principle of relevance, Karl should not take this possibility seriously.

To sum up, in normal cases, a possibility of false temporally self-locating beliefs is either a relevant alternative which can be easily precluded, or an irrelevant alternative which should not be taken seriously. Therefore, growing blockists who are ignorant of the objective present can be immune from the slope of ignorance.

6 An Objection from Fundamentality

I have finished the main epistemic discussion of my paper, and I am going to close with a metaphysical speculation. It is a good start to consider the analogy between Anti-Humeanism and GBT here. Anti-Humeans tend to think there are fundamental necessary connections in the world, but Humeans deny the existence of such connections. For Humeans, all modal and nomological facts about the world are grounded by the “Humean mosaic”, viz. the complete physical state of the world, which consists of spacetime points and spatiotemporal relations between those points. (Maudlin 2007: p. 50-51; Briggs & Forbes 2017: p. 929-930). For Humeans, fundamental necessary connections are epistemically inaccessible and “*deeply mysterious*” (Briggs & Forbes 2017: p. 929), and thus Anti-Humeanism which admits of them is a mysterious and epistemically unacceptable theory.

Some of my opponents may think, growing blockists who accept the ignorance of the objective present would also face a similar difficulty to Anti-Humeans’: According to a common traditional conception of objective presentness, the objective present is the most fundamental entity in the growing block, and facts about the objective present *ground* all other facts about the growing block. Especially, it is the fact that the different moments of time instantiate objective presentness sequentially that characterizes the existence of the objective flow of time, which marks GBT as a version of A-theories. If growing blockists accept both this conception and the ignorance of the objective present, their theory has to include an epistemically inaccessible, “deeply mysterious” fundamental posit, leading to the result that GBT loses its epistemic acceptability, compared with its major rivals namely presentism and eternalism. For some growing blockists, this *objection from fundamentality of objective presentness* may be the most important reason why they must reject the epistemic objection.

6.1 Non-fundamentality Conceptions of Presentness I: GBT-TOP

A natural response to the objection from fundamentality is to exclude epistemically inaccessible fundamental posits from the ontology of GBT by denying the fundamentality of objective presentness. Based on the fact that the objective present in

the growing block is exactly the last real time-slice, a weaker conception of non-fundamental presentness can be naturally stated as follows:

Thin Objective Presentness (TOP). The property of objective presentness is nothing but the property of being the last real time-slice of the block.

If TOP is true, objective presentness is not the most fundamental entity in the growing-blockist world. Rather, it is merely a *non-fundamental relational property*. For any total state of the world, W_n , and any moment of time, t_i , t_i becomes the objective present (the last real time-slice) in W_n by virtue of its B-relations to other real moments of time in W_n . Thus, objective presentness only shows that the moment instantiating it has a unique location in the B-series of times, but that moment is not thereby more ontologically fundamental than other real moments in the block.

The combinatorial view of GBT and TOP, call it as ***GBT-TOP***, actually replaces the ontologically privileged status of the objective present with a sort of *nominal privilege* which is wholly defined by B-relations between moments of time. Unfortunately, TOP is too weak for growing blockists because it cannot retain the objective flow of time in the growing-blockist world. Consider such a possible eternalist world: All of its real time-slices can be ordered via the *not-later-than* relation into a bounded linear B-series with the only one final time-slice, and all facts about B-relations between its time-slices are fixed. Obviously, if TOP is true, this eternalist world also includes a real time-slice instantiating “objective presentness”, but it is still fundamentally static on the ground that the “objective present” is stuck and thus there is no objective flow of time. Therefore, growing blockists should not accept TOP, otherwise the growing-blockist world would be metaphysically indistinguishable from eternalist worlds including the stuck “objective present”.

A lesson which growing blockists learn from the failure of GBT-TOP is that the property of objective presentness, even if it is really non-fundamental, cannot be wholly reduced to B-relations between time-slices. In other words, a GBT-friendly non-fundamentality conception of presentness should treat some sort of facts about A-theoretic properties except the property of objective presentness as a *partial ground* of facts about the objective present.

6.2 Non-fundamentality Conceptions of Presentness II: GBT-TDP and GBT-TSDP

In this subsection, I will show two sorts of GBT-friendly conception of non-fundamental presentness, which are directly inspired by Cameron (2015, 2017). neither of them can resolve the objection from fundamentality in a better way than the traditional conception of objective presentness.

6.2.1 GBT-TDP

As T. Sider (2017) notes, it is by appeal to antireductionism about both *temporal distributional properties* and *ages* that Cameron (2015) develops his own version of MST (CMST) (see Section 4.1). In any total world state, W_n , a real object, whether it is objectively present or not, has only three sorts of fundamental properties: its (*maximal*) temporal distributional property, its spatiotemporal location, and its age.

According to Sider (2017), “a temporal distributional property is a property that, intuitively, concerns the sequence and arrangement of intrinsic properties that a thing possesses over time.” (Sider 2017: p. 789) In contrast to commonsense view about temporal distributional properties, Cameron’s antireductionism claims, the fact that a real object instantiates its *maximal* temporal distributional property (partially) grounds all facts about its possession of non-distributional properties. For example, the fact that Socrates instantiated the non-distributional property of being alive in 400 B.C. and then instantiated the non-distributional property of being dead in 399 B.C. is (partially) grounded by the fact that Socrates instantiates the temporal distributional property of first-being-alive-and-then-being-dead at the objective present. Given the maximal temporal distributional property Socrates has at the objective present, we can thereby determine his intrinsic nature at any of his spatiotemporal locations in the world, *simpliciter*.

The temporal distributional property of a real object shows that it *instantiated/instantiates/will instantiate* different sets of (non-distributional) intrinsic properties at his different spatiotemporal locations. Which of set of intrinsic properties constitutes its *present intrinsic nature*? Cameron’s antireductionism about ages offers an answer to this question. Commonsense views think that the age of a real object is

the temporal duration in its existence. For example, if Karl was born in 1994 and then remains to exist in 2019, then Karl's age in 2019 is 25 years old. However, this sort of ordinary age property has nothing to do with the objective present, and thus is unable to play a role in determining objective presentness. By contrast, the Cameronian age property instantiated by an object is, intuitively, the temporal distance between the objective present and a certain "reference moment of time" which may be an object's first moment, or its last moment, or an arbitrarily chosen moment (Sider 2017: p. 796-797). Given the "reference moment of time", Cameronian age can be used to pick out the moment of time instantiating objective presentness, and thus make the set of intrinsic properties instantiated at that moment constitute the real and present intrinsic nature of the object.

It should be noted that Cameron's antireductionist view may be not a non-fundamentality conception of presentness. After all, it is not difficult to see that the Cameronian age property and the property of objective presentness can be defined by each other. Given this fact, the Cameronian age property, though irreducible and fundamental, may be not more fundamental than objective presentness. Cameron is even entitled to say that objective presentness is as fundamental as the age property.

Anyway, it is true that Cameron's antireductionist view can be seen as a conception of non-fundamental presentness. More importantly, Cameron's antireductionism about temporal distributional properties and ages does not involve any structural difference between CMST and GBT, and thus growing blockists have no difficulty in introducing temporal distributional properties and Cameronian ages to their ontology.

Let us call the combinatorial view of GBT and Cameron's antireductionist view as ***GBT-TDP***. According to GBT-TDP, in the growing-blockist world, every real object is said to have a fixed temporal distributional property and "an absolute and constantly increasing age" (Olson 2009: p. 3). Temporal distributional properties of those objects specify their intrinsic nature over time; and their ages determine which moment of time is objectively present and thus which set of intrinsic properties constitute their present intrinsic nature. Considering that GBT-TDP can characterize the objective flow of time as the constant increase of Cameronian ages of real objects, GBT-TDP is thus a better version of *the non-fundamentality of presentness growing block theory* than GBT-TOP.

6.2.2 GBT-TSDP

In my view, the core insight of GBT-TOP that objective presentness in the growing-blockist world can be explained by B-relations between moments of time to some degree is not a complete failure. Inspired by Cameron's antireductionism about temporal distributional property, GBT-TOP can be developed into a sort of new non-fundamental-presentness growing block theory, *GBT-TSDP*.

GBT-TSDP includes several important aspects as follows:

Firstly, proponents of GBT-TSDP disagree with Cameron that every real object has an irreducible and fundamental age property. Rather, they assume that only the world *per se* has a fundamental age property by which ages of other individual objects are derivatively determined. Moreover, it is the constant increase of age of the world *per se* that characterizes the objective flow of time. This should be an advantage of GBT-TSDP over GBT-TOP.

Secondly, defenders of GBT-TSDP deny that real individual objects have irreducible temporal distributional properties, but they instead accept a similar antireductionist claim about the *total-state distributional property* of the world *per se*.

Recalling the theoretical construction of double time and our representation of the growing-blockist world (Section 1.3). In the growing-blockist world, each moment of time could be an A-time. If a moment happens to be an A-time, then it determines a certain total state of the world. As we have seen, the growing-blockist world has many distinct total states sequentially, each of which is determined by a certain A-time. All total states that the world *per se* has sequentially can be ordered via the *earlier-later* relation of their A-times into an *A-series*. A notable difference between the B-series of moments of time and the A-series of total world states is that all moments in the B-series are equally real while not all total world states in the A-series are. As we have seen in Section 1.3, there is only a real total world state in the A-series, otherwise GBT would face a McTaggartian paradoxical result.

According to GBT-TSDP, the *total-state distributional property* of the world *per se* is a property that, intuitively speaking, concerns the A-series of all total states that the world *per se* has sequentially.

The point of speaking of the world's total-state distributional property is to place the commonsense order of *ontological dependence* upside down: whereas growing blockists usually think that the world *per se* has its total-state distributional property because it has those (non-distributional) total states sequentially, and the world is in a

certain total state because a certain moment of time happens to be its A-time, proponents of GBT-TSDP instead claim that the fact that the world *per se* has a certain total-state distributional property (ptially) grounds all facts about its (non-distributional) total states, and the fact that the world *per se* is exactly in a certain total state (partially) grounds the fact that a certain moment of time happens to be a A-time.

In GBT-TSDP's ontology, only three categories of properties and relations are at the most fundamental level: *the world's (Cameronian) age*, *the total-state distributional property*, and *the earlier-later relation*. The world's age and its total-state distributional property determine which of total states in the A-series is exactly the real total state of the world *per se*. Once the real total world state is determined, we can pick out the last time-slice in the growing block by appeal to the earlier-later relation between time-slices in that total state, and the time-slice picked out is exactly the objective present.

If what GBT-TSDP says is right, the property of objective presentness is still a non-fundamental relational property. After all, which of time-slices instantiates objective presentness is wholly determined by more fundamental B-relations between time-slices plus *something else* (the world's age and its total-state distributional property). In this sense, GBT-TSDP captures the core insight of GBT-TOP. Furthermore, GBT-TSDP does better than GBT-TOP in characterizing the objective flow of time: Facts about the A-theoretic age property of the world *per se* partially ground not only facts about objective presentness but also the fact that there is an objective flow of time. We can thereby conclude that GBT-TSDP indeed offers a better conception of non-fundamental presentness than GBT-TOP.

6.3 A New Dilemma...

At least two distinct GBT-friendly conceptions of non-fundamental presentness have been given by GBT-TDP and GBT-TSDP. Nevertheless, in my eyes, neither of them deals with the objection from fundamentality successfully. As we have seen, in order to characterize the non-fundamental property of presentness, GBT-TDP and GBT-TSDP have to introduce a more fundamental A-theoretic property (viz. the Cameronian age property) to their ontologies, respectively. However, the introduced Cameronian age property is also mysterious and epistemically inaccessible to us, unlike the commonsense age property.

To see this, we should notice that knowledge about the commonsense age property is indeed a part of our ordinary knowledge: for example, Karl, as a normal cognitive agent in the growing-blockist world, seldomly make mistakes in asserting that he is 25 years old *now* (in 2019). If GBT-TDP is true, however, Karl's Cameronian age may be not identical to his commonsense age on the ground that, as the epistemic objection has shown, it is perfectly possible that Karl's current temporal location, the year of 2019, is in the objective past. Considering the intimate connection between Karl's Cameronian age property and objective presentness, how can Karl know of his Cameronian age property if he lacks knowledge about the objective present? Given the ignorance of the objective present, it seems that normal cognitive agents in the growing-blockist world have no other cognitive means to access their Cameronian ages.

In contrast to GBT-TDP, GBT-TSDP claims that only the world *per se* has a fundamental Cameronian age. Unfortunately, our cognitive situation in GBT-TSDP is worse than in GBT-TDP: How can we know of the world's age? Indeed, our best cosmological science tells us that the universe has been about 13.7 billion years old up to now, but this scientific fact is merely a fact about the current commonsense age of the universe rather than its Cameronian age. Still, we lack epistemic access to the world's (Cameronian) age due to its intimate connection to the objective present and our ignorance of the objective present.

The reason why GBT-TDP and GBT-TSDP do not succeed in resolving the objection from fundamentality is that they have to include an equally mysterious and epistemically inaccessible fundamental posit in their ontology, even if they have denied the fundamentality of epistemically inaccessible presentness.

In fact, my conclusion is a more general one: *None of non-fundamentality conceptions of presentness can save GBT from the objection from fundamentality.* My reasons can be stated as a *new dilemma* as follows:

In order to reply to the objection from fundamentality, growing blockists require such a conception of non-fundamental presentness: either (i) facts about objective presentness are wholly grounded by facts about B-relations between time-slices, or (ii) facts about objective presentness are grounded by facts about B-relations plus facts about some more fundamental A-theoretic property.

If growing blockists go the first way, like proponents of GBT-TOP does, then the non-fundamental property of "objective presentness" is so B-theoretic that GBT thereby collapses into a version of B-theories. This is an unacceptable result for

growing blockists.

If they choose the second way, like defenders of GBT-TDP or GBT-TSDP, however, they have to admit of some more fundamental A-theoretic property which is as mysterious and inaccessible as objective presentness. Thus, their non-fundamentality conception does not behave better than the traditional conception of fundamental presentness at least in dealing with the objection from fundamentality.¹⁰

To sum up, I believe that it is a real price of my biting-the-bullet solution that GBT's ontology inevitably involves some epistemically inaccessible fundamental posit.

¹⁰ There are some other possible conceptions of non-fundamental presentness available to growing blockists. For example, like Correia and Rosenkranz (2015) did, growing blockists may define objective presentness in terms of fundamental pastness and futureness. (The property of futureness in the growing-blockist world should be understood as a real but uninstantiated property). Or, if they are willing to accept some sort of *event ontology* in which real moments of time are nothing than sets of events, they may follow Deasy (2015)'s suggestion to define the property of objective presentness by the property of *occurring*, or *taking place* (Deasy 2015: p. 2077, fn 11). Of course, these possible conceptions of presentness, whether successful or not, cannot be immune from my above criticism, too.

7 Conclusion: The Significance of the Epistemic Objection

The debate about the nature of time has been going on for a long time between presentists and B-theorists (eternalists). Afterwards, some *intermediate positions* like GBT and MST also entered the battlefield and complicated the situation. Some philosophers expect that these intermediate positions have the potential to give a final metaphysical explanation of what is time like by integrating theoretical resources from both presentism and the B-theory (eternalism). As we have seen, however, the epistemic objection creates obstacles for the prospects of their success. If the epistemic objection is serious as it seems to be, all intermediate positions between presentism and the B-theory would be untenable. Then, the best rival view of B-theories can be only some version of presentism.

To deal with the dilemma produced by the epistemic objection and the semantic unity, I recommend growing-blockists to accept the ignorance of the objective present. It is true that growing blockists have to pay a price for this biting-the-bullet solution. For example, they should admit that GBT has no Moorean advantage over B-theories in the sense that normal cognitive agents lack the epistemic access to the objective present (Section 5.2); and they also need to introduce some mysterious and epistemically inaccessible fundamental posit to their ontology (Section 6).

Nevertheless, in my view, the biting-the-bullet solution is worth the cost. Once this solution is taken, growing blockists can retain GBT's semantic unity in explaining the past tense and the present tense, and thus prevent GBT from collapsing to presentism (Section 5.1). Furthermore, although ignorant of the objective present (or some more fundamental A-theoretic property like the Cameronian age property), growing blockists have still abundant knowledge of the growing block. For example, they are at least in a position to know of their temporal locations and some (although not all) B-relations among times (Section 5.3).

Based on the above considerations, I conclude that the ignorance of the objective present should not be a big loss for growing blockists. More importantly, my solution to the epistemic objection shows that presentism is not the only rival which B-theorists need to compete against in the dispute about the nature of time—— there are indeed some tenable immediate positions which need to be considered by them seriously.

References

- [1] Bourne, C. 2002. When am I? A Tense Time for Some Tense Theorists?[J]. *Australasian Journal of Philosophy*, 80 (3): 359-371.
- [2] Braddon-Mitchell, D. 2004. How Do We Know It Is Now Now?[J]. *Analysis*, 64 (3): 199–203.
- [3] Bradley, D. 2014. A Relevant Alternatives Solution to the Bootstrapping and Self-Knowledge Problems[J]. *Journal of Philosophy*, 111(7): 379-393.
- [4] Briggs, R. & Forbes, G. A. 2017. The Growing-Block: Just One Thing after Another?[J]. *Philosophical Studies* 174 (4): 927-943.
- [5] Button, T. 2006. There's No Time Like the Present[J]. *Analysis*, 66 (2): 130–135.
- [6] Button, T. 2007. Every Now and Then, No-futurism Faces No Sceptical Problems[J]. *Analysis*, 67 (4): 325–332.
- [7] Cameron, R. P. 2015. *The Moving Spotlight: An Essay on Time and Ontology*[M]. Oxford: Oxford University Press.
- [8] Cameron, R. P. 2017. Reply to Miller, Sider and Skow[J]. *Analysis*, 77 (4): 810-824.
- [9] Cameron, R. P. 2018. Skow, Objective Becoming and the Moving Spotlight[J]. *Analysis*, 78(1): 97-108.
- [10] Correia, F. & Rosenkranz, S. 2013. Living on the Brink, or Welcome Back, Growing Block![A]/K. Bennett and D. W. Zimmerman (ed.), *Oxford Studies in Metaphysics*[C]. Volume 8. Oxford: Oxford University Press, 333–350.
- [11] Correia, F. & Rosenkranz, S. 2015. Presentism without Presentness[J]. *Thought: A Journal of Philosophy*, 4 (1): 19-27.
- [12] Deasy, D. 2015. The Moving Spotlight Theory[J]. *Philosophical Studies*, 172(8): 2073-2089.
- [13] Forbes, G. A. 2016. The Growing Block's Past Problems[J]. *Philosophical Studies*, 173 (3): 699-709.
- [14] Forrest, P. 2004. The Real but Dead Past: A Reply to Braddon-Mitchell[J]. *Analysis*, 64 (4): 358-362.
- [15] Heathwood, C. 2005. The Real Price of the Dead Past: A Reply to Forrest and to Braddon-Mitchell[J]. *Analysis*, 65 (3): 249-251.
- [16] Kaplan, D. 1989. Demonstratives[A]/J. Almog, J. Perry & H. Wettstein (eds.), *Themes from Kaplan*[C]. Oxford: Oxford University Press, 481-563.
- [17] Luper, S. 2018. Epistemic Closure[EB/OL]/E.N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Winter 2018 Edition), [2019-4-11].
<https://plato.stanford.edu/archives/win2018/entries/closure-epistemic>.

- [18] Maudlin, T. 2007. *The Metaphysics Within Physics*[M]. Oxford: Oxford University Press.
- [19] Merricks, T. 2006. Good-Bye Growing Block[A]/D. Zimmerman (ed.), *Oxford Studies in Metaphysics*[C]. Volume 2. Oxford: Oxford University Press, 103-110.
- [20] Miller, K. 2017a. Presentness, Where Art Thou? Self-locating Belief and the Moving Spotlight[J]. *Analysis*, 77(4): 777-788.
- [21] Miller, K. 2017b. Time Passages[EB/OL]. Published in *Journal of Consciousness Studies*, 24(3): 149-176. Cited from PhilPapers, [2019-4-10], 1-26.
<https://philpapers.org/rec/KRITP>.
- [22] Miller, K. 2018. The New Growing Block Theory vs Presentism[J]. *Inquiry: An Interdisciplinary Journal of Philosophy*, 61 (3): 223-251.
- [23] Olson, E. T. 2009. The Rate of Time's Passage[J]. *Analysis*, 69(1): 3-9.
- [24] Perry, J. 1979. The Problem of the Essential Indexical[J]. *Noûs*, 13(1): 3-21.
- [25] Russell, J. S. 2017. Temporary Safety Hazards[J]. *Noûs*, 51(4): 152-174.
- [26] Sider, T. 2017. Ross Cameron's The Moving Spotlight. *Analysis*, 77(4): 788-799.
- [27] Skow, B. 2015. *Objective Becoming*[M]. Oxford: Oxford University Press.
- [28] Steup, M. 2018. Epistemology[EB/OL]/E.N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Winter 2018 Edition), [2019-4-10].
<https://plato.stanford.edu/archives/win2018/entries/epistemology>.
- [29] Sullivan, M. 2012. The Minimal A-theory[J]. *Philosophy Studies*, 158(2): 149-174.

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Human praise is the praise of human bravery, human greatness is the greatness of bravery.

—— Baron Zeppeli, cited from *JOJO's Bizarre Adventure: Phantom Blood* (vol. 3)

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